

1.0 INTRODUCTION

This report is a summary of field inspection results during construction of the Muscoy Operable Unit (OU) Interstate 215 (I-215) and Burlington Northern and Santa Fe Railroad (BNSF) undercrossing construction.

The construction inspection was performed by URS Group, Inc. (URS) for the United States Environmental Protection Agency (EPA). URS performed the inspection under contract number 68-W-98-225 and work assignment member 069-RARA-09J5.

1.1 BACKGROUND

During a groundwater investigation in 1980, the California Department of Health Services (DHS) discovered chlorinated solvents in municipal supply wells within the northern San Bernardino/Muscoy region of San Bernardino. Several investigations were conducted to locate the potential source(s) of contamination. On March 30, 1989, EPA placed this region on the National Priorities List, thereby releasing federal funds for cleanup of the region, now identified as the Newmark Groundwater Contamination Superfund Site (site).

The principal contaminants identified in site investigations were trichloroethene (TCE) and tetrachloroethene (PCE). Reported concentrations of these contaminants exceed federal and California maximum contaminant levels (MCLs) for drinking water in several municipal wells within the San Bernardino and Muscoy areas, including the Newmark Municipal Wellfield.

A remedial investigation and a feasibility study were performed for the site between 1989 and 1994. As part of the Newmark OU Remedial Design (RD) and Remedial Action (RA), groundwater treatment systems and extraction wellhead facilities were installed and are currently operating. Design details of these facilities are presented in separate design documents. The Muscoy OU is currently in the RA phase; this document is part of the RA effort for the Muscoy OU.

1.2 PROJECT DESCRIPTION

The Muscoy Plume OU RA includes connecting two existing City of San Bernardino Municipal Water Department (SBMWD) transmission pipelines (the pipelines were constructed under Phases 1 and 2 of this RA) located on W. 10th Street to the east and west of Interstate 215. The undercrossing work consists of boring beneath I-215 and the BNSF railroad, installing 36-inch-diameter steel casing with 20-inch ductile iron pipe (DIP) carrier pipe and connecting the pipe to the existing pipelines on W. 10th street. The undercrossing connects the SBMWD transmission pipeline from wells EW-1 and EW-108 with the transmission pipeline for wells EW-109, EW-110, EW-111, and EW-112. The pipeline will carry water from the wells to the 19th Street groundwater treatment plant (19th Street Plant) for treatment by 24 granular activated carbon (GAC) vessels. After treatment at the 19th Street Plant, the treated water will be conveyed through existing SBMWD transmission pipelines for distribution by SBMWD. The scope of work for the undercrossing construction included:

- Supply and installation of approximately 240 feet of 36-inch-diameter steel casing through the jack and bore method, including design and construction of the jacking and receiving pits;

- Supply and installation of approximately 195 feet of steel casing installed by the cut and cover method;
- Supply and installation of approximately 435 feet of 20-inch DIP carrier pipe inside the casing;
- Supply and installation of 60 feet of 20-inch DIP to connect both ends of the pipeline with previously installed 20-inch DIP;
- Supply and installation of one 8-inch blow off assembly, one 2-inch combination air-vacuum assembly, two 20-inch DIP 45 degree bends, two 20-inch 22.5 degree bends, and one 20-inch butterfly valve.

El-Co Construction, Inc. (El-Co), with Ayala Boring, Inc. (Ayala) as a subcontractor, was contracted by URS to complete the above scope of work.

2.0 CONSTRUCTION SUMMARY

2.1 MONTHLY SUMMARIES

The field construction activities began with the implementing traffic control measures and surveying for the settlement markers and jacking pit in December 2004. Construction activities continued through the completion of the carrier pipeline installation, testing, and final acceptance on April 5, 2005. The following monthly summaries describe the construction fieldwork completed during each month of the project, important issues that arose during the month, and the issues' resolution. Access agreements are included in Appendix A. The detailed Weekly Construction Progress Reports prepared by the URS Construction Manager, Matt Dwyer, are included in Appendix B, and the detailed Inspector's Daily Reports prepared by the URS Resident Inspector, Nick Reylek, are included in Appendix C.

Highlights of Construction:

December 2004 (Weekly Reports 001 - 004)

- El-Co mobilized to the site and installed traffic control measures.
- El-Co completed surveying to locate the existing 20-inch DIP pipeline on the west side of I-215 and to lay out the jacking pit on the east side of I-215.
- El-Co completed the excavation and construction of the jacking pit and performed the California Occupational Safety and Health Administration (Cal/OSHA) inspection on December 21, 2004.
- The excavation of the jacking pit was delayed by one day due to issues related to the location of a monitoring well installed during the geotechnical evaluation of the undercrossing work. The well was capped and replaced in kind after the undercrossing construction was completed.
- Ayala mobilized the jack and bore equipment and began operations to install the 36-inch steel casing on December 21, 2004. Approximately 160 linear feet of 36-inch steel casing was installed.
- Settlement markers were installed along the pipeline and the daily settlement marker survey program began on December 21, 2005.

January 2005 (Weekly Reports 005 - 008)

- El-Co continued the daily settlement marker survey program and began the weekly settlement marker survey program after completion of the jack and bore of the 36-inch casing.
- Approximately 80 linear feet of 36-inch steel casing were installed and the jack and bore section of casing installation was completed. The boring pit was backfilled, and El-Co began the open-cut portion of the casing installation.

- El-Co excavated and shored the receiving pit on the west side of the BNSF railroad right of way.
- El-Co removed accumulated storm water and mud from the boring pit, the receiving pit, and from inside the 36-inch casing.
- The site received in excess of the historical 100-year rainfall (over 14 inches of rain in a 4-day period). El-Co monitored the rainfall and storm water protection devices at the two pits and were proactive in removing water to prevent damage.
- Ayala completed the pressure grouting of the 36-inch steel casing.

February 2005 (Weekly Reports 009 - 012)

- El-Co completed the weekly settlement marker survey program.
- El-Co completed the open-cut portion of the installation of the 36-inch steel casing. El-Co began and completed the installation of the 20-inch DIP carrier pipe.
- El-Co pressure tested, flushed and chlorinated the 20-inch DIP carrier pipe. SBMWD conducted bacteriological testing. El-Co completed the tie-ins to the existing 20-inch DIP transmission pipelines on the east and west sides of I-215.
- Ayala slurry filled the annulus between the 36-inch steel casing and the 20-inch DIP carrier pipe.
- El-Co completed asphalt paving on the west side of the BNSF Railroad.

March 2005 (Weekly Reports 013 - 016)

- El-Co completed asphalt cap overlay on W. 10th Street, east of I-215.
- Final inspections with BNSF Railroad and California Department of Transportation (CalTrans) representatives were completed on March 9, 2005 and March 13, 2005, respectively.

April 2005

- Final inspection and acceptance was conducted by SBMWD, EPA and URS on April 5, 2005.

2.2 QUALITY ASSURANCE TESTING SUMMARY

Soils and Compaction Testing

Signet Testing Labs, a certified independent testing laboratory, performed the soil laboratory testing and field compaction tests. The URS Resident Inspector, Nick Reylek, directed compaction testing locations and frequency. Tests were taken of the trench backfill, jacking and receiving pit backfill, subgrade and base materials. All compaction tests were taken with a nuclear density gauge, using the nuclear density gauge method per ASTM Standards D2922 and D3017. Trench backfill under the roadway was mechanically compacted to 90% of the maximum relative density, except for the top 6 inches of subgrade, which was compacted to 95% of the maximum relative density. Appendix D contains the soil compaction testing results.

Hydrostatic Testing, Chlorination, and Flushing

The hydrostatic test was performed on the newly installed pipeline when it was completed. URS Resident Inspector, Nick Reylek, witnessed the testing of each section of pipeline. The pipeline section was filled with water and was pressure tested at 150 pounds per square inch continuously for a period of 2 hours. Water leakage was measured by determining the quantity of water required to maintain test pressure in the pipeline section. No additional water was needed on any section of the pipeline during these tests, and all sections passed the hydrostatic tests. The hydrostatic testing is documented in the Inspector's Daily Reports, included in Appendix C.

Upon completion of successful hydrostatic testing, the pipeline sections were disinfected. Chlorine was introduced by a water injector into the pipeline section that was previously filled with water. The chlorine concentration was specified to be between 50 and 80 parts per million (ppm), and this mixture was retained inside the pipeline section for a 24-hour period. After this time period, the chlorine residual was specified to be at least 25 ppm. The SBMWD Water Quality Control Supervisor, Con Arrieta, confirmed the concentration of chlorine before and after the 24-hour duration. Following chlorination, all water in the pipeline section was flushed out until the replacement water showed the absence of chlorine.

Bacteria Testing

SBMWD personnel collected water samples from the flushed section of the pipeline and had the samples analyzed for the presence of coliform bacteria. The pipeline showed favorable test results. Copies of these test results are included in Appendix E.

Settlement Monitoring

El-Co placed settlement monitoring points on I-215 and the BNSF railroad along the centerline, and 10 feet east and west of the centerline of the pipeline alignment. The markers were surveyed prior to advancing the boring, daily during the duration of the boring, and weekly after pressure grouting around the exterior of the 36-inch casing. No settlement outside of the maximum allowable settlement of 0.020 feet was detected. Daily, weekly, and the 6-month (after final acceptance) settlement monitoring results are included in Appendix F. Final 12-month (after final acceptance) settlement monitoring survey will be performed on February 15, 2006.

Geotechnical Engineering Observations

A URS geotechnical engineer was onsite during the start of the jack and bore portion of the project to ensure that the jacking equipment was in compliance with the specifications and the previously prepared geotechnical report. A copy of the specifications are included in Appendix G. A copy of the geotechnical report is included in Appendix H. The geotechnical engineering observations are included in Appendix I.

2.3 SAFETY AND HEALTH

Installing pipelines on busy city and residential streets and installing casing and piping below the freeway and railroad presents numerous challenges to the field crews completing the work. As such, the project was performed with a high degree of concern for the safety and health of the work force and the general public. El-Co conducted weekly tailgate safety meetings to enforce safe work practices and to discuss potential safety concerns of the crews and the local residents. Prior to beginning the jacking operations, a Cal/OSHA representative performed a complete safety inspection of the 16-foot-deep jacking pit, including the shoring, hand rail system, ventilation and air monitoring systems, truck and crane equipment, excavation permit, competent person certifications, health and safety equipment, and training certificates. The Cal/OSHA inspector approved of the safety measures that had been instituted by the project team and informed the team that work could commence.

2.4 COMMUNITY RELATIONS

URS worked with Jackie Lane/EPA and Russell Smith/SBMWD to develop a proactive approach to community relations during the I-215/BNSF undercrossing work. During the installation of the undercrossing, no issues were raised by the local residents.

2.5 PERMITS

In order to advance the boring beneath I-215 and the BNSF railroad, access agreements were issued to the EPA by BNSF and CalTrans. A copy of the BNSF Consent to Access and the CalTrans Encroachment Permit are included as Appendix A.

2.6 CHANGE ORDER SUMMARY

No subcontract modifications occurred during the construction of the I-215/BNSF undercrossing.

2.7 CONSTRUCTION PHOTOS

Included in Appendix J are the photos taken by URS Resident Inspector, Nick Reylek, during the construction of the I-215/BNSF undercrossing. Twenty photos have been selected from the total of 103 that show the progress of the project from start to completion. In addition to the 20 printed photos, Appendix J provides a photo log listing all 103 photos and a CD containing all 103 photos.

2.8 FINAL INSPECTION

Final inspection and acceptance by BNSF and CalTrans were performed on March 9, 2005, and March 14, 2005, respectively. Final inspection and acceptance of the I-215/BNSF undercrossing construction project was conducted by SBMWD and EPA on April 5, 2005. Kim Hoang/EPA, Bernard Kersey/SBMWD, Bill Bryden/SBMWD, Bob Kemmerle/E2 Consulting, Adam Harvey/URS, and Nick Reylek/URS were in attendance to accept the work, list any outstanding issues, and give formal acceptance of the project if there were no outstanding issues remaining to be resolved. There were no outstanding issues to be resolved and the project was accepted. A copy of the signed final inspection and acceptance forms from SBMWD and EPA, along with the BNSF and the CalTrans 100% completion notice are included in Appendix K.

2.9 CONCLUSION

The pipeline installation project was completed according to the plans and specifications. Construction specifications and record drawings of the completed pipeline have been prepared and are included in Appendices G and L, respectively.